

APPLICATION FOR UNITED STATES LETTERS PATENT

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TITLE:

METHOD OF AND APPARATUS FOR MAKING
AND MANIPULATING COUPONS IN CIGARETTE
PACKING MACHINES

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ATTORNEY REFERENCE:

31976-176024 RK

CROSS-REFERENCE TO RELATED CASES

This application claims the priority of the commonly owned copending German patent application Serial No. 100 56 407.0 filed November 14 2000. The disclosure of the above-referenced German patent application, as well as that of each US and foreign patent and patent application identified in the specification of the present application, is incorporated herein by reference.

5

BACKGROUND OF THE INVENTION

The invention relates to improvements in methods of and in apparatus for making and manipulating coupons and other sheet-like parts or blanks which are to be confined in containers of the kind known as packs and serving to store cigarettes or other types of smokers' products. More particularly, the invention relates to improvements in methods of and in apparatus for confining coupons and/or other types of sheet-like blanks in packs of the kind wherein the commodities (such as arrays of plain or filter cigarettes or other rod-shaped smokers' products) are confined in inner envelopes (e.g., in envelopes constituting converted blanks of metallic foil) which, in turn, are confined in outer envelopes (such as shaped blanks of paper, cardboard and/or light-transmitting sheet material).

Commonly owned copending patent application Serial No. 09/987,210 filed November 13, 2001 by the joint inventors named in the present application for "METHOD OF AND APPARATUS FOR MANIPULATING COUPONS AND THE LIKE IN CIGARETTE PACKING MACHINES" (hereinafter called copending application) discloses a method including the steps of withdrawing successive blanks from a magazine and conveying successive withdrawn blanks to an assembling station wherein the blanks assume predetermined positions, espe-

cially relative to so-called collars which are employed
in hinged lid type cigarette packs. Fig. 1 of the
present application is identical with Fig. 1 of the
coperating application and shows a blank on its way from
5 a magazine toward the predetermined position, namely
to a position at least partly beneath a collar and at
least partly above a pocket in a folding device of the
cigarette packing machine. The magazine defines an
upright duct for a stack of superimposed blanks, and mo-
10 bile suction heads or suction cups are employed to convey
successive lowermost blanks from the outlet of the
magazine toward the assembling station.

The apparatus which is described and shown in the
coperating application renders it possible to convey and
15 to position successive blanks with a high degree of accu-
racy. However, such apparatus must be utilized in
conjunction with precision finished and hence complex
and rather expensive equipment for introducing stacks
of blanks into the magazine. Alternatively, the stacks
20 must be fed into the magazine by hand; this, is a time-
consuming operation which cannot always be resorted to
in modern high-speed machines of the type capable of
turning out huge quantities of cigarette packs per unit
of time.

of Focke et al. (published March 16, 2000) discloses a method of and an apparatus for supplying to a cigarette packing machine a series of coupons from a magazine by a variable-speed conveyor. This publication does not propose a solution of problems which arise in connection with the replenishment of the supply of coupons or the like in the magazine of a high-speed cigarette packing machine.

US patent No. 3,929,326 (granted December 30, 1975 to Seragnoli for "DEVICE FOR ACCUMULATING AND SUPPLYING LENGTHS OF MATERIAL IN SHEET FORM") discloses an apparatus which monitors the stack of coupons in the magazine of a packing machine for cigarettes or the like and an indexible device which feeds, when necessary, piles of coupons into the magazine.

US patent No. 5,931,292 (granted August 3, 1999 to Focke et al. for "PACKET FOR TOBACCO GOODS ESPECIALLY CIGARETTES, AS WELL AS METHOD AND DEVICE FOR MANUFACTURING SAME") proposes to provide cigarette packs with revenue labels which are intended to be glued to the outer sides of transparent outer envelopes of the cigarette packs. The revenue stamps are taken from a magazine. The patent does not disclose the manner in which the revenue stamps are formed and/or introduced into the magazine.

US patent No. 6,105,340 (granted August 22, 2000
to Draghetti for "METHOD OF FASHIONING PACKETS OF CIGA-
RETES AND EQUIPMENT FOR THE IMPLEMENTATION OF SUCH A
METHOD") proposes to apply coupons and revenue stamps
5 to the outer sides of opaque wrappers prior to the con-
finement of such opaque wrappers in cellophane wrappers
of cigarette packs. The coupons and the revenue stamps
are stored in two discrete magazines.

OBJECTS OF THE INVENTION

An object of the present invention is to provide a packing machine for cigarettes or other smokers' products wherein the feeding of coupons, revenue labels and/or other blanks into one or more magazines and/or directly to the blank processing station is carried out 5 in a novel and improved way.

Another object of the invention is to provide a 10 novel and improved method of maintaining the supply of coupons and/or other blanks in a cigarette packing machine at a desired level in a novel and improved manner.

A further object of the instant invention is to provide a method which renders it possible to supply coupons, revenue labels and/or other types of sheet-like 15 blanks to packing machines for cigarettes or other smokers' products in a manner to avoid damage to (such as bending, flexing, creasing, crimping or other undesirable deformation of) blanks regardless of the rate at which the blanks are being processed in the machine.

20 An additional object of this invention is to provide a method which renders it possible to select the dimensions of the blanks with a high degree of accuracy.

Still another object of the invention is to provide a method which ensures that blanks which are to be 25 confined in cigarette packs or the like can be inserted

into the packs in such a way that they can be readily withdrawn from opened packs without damage to the blanks and/or to the packs.

A further object of the invention is to provide
5 a packing machine for cigarettes or the like with novel and improved means for supplying blanks in a time- and space-saving manner.

Another object of the invention is to provide a packing machine for cigarettes or other smokers' products
10 which need not be equipped with one or more magazines for coupons and/or other types of blanks but can supply blanks to one or more processing stations at least as reliably as and at a frequency not less than in conventional packing machines with magazines.

SUMMARY OF THE INVENTION

One feature of the present invention resides in the incorporation into a packing machine for smokers' products of a device for subdividing an elongated web of coherent blanks into discrete blanks preparatory to confinement of discrete blanks in packs of smokers' products.

For example, each blank can constitute a coupon which bears advertising matter, promotional material or the like.

Another feature of the present invention resides in the provision of an apparatus for manipulating blanks in a machine for packing smokers' products. The improved apparatus comprises a source of blanks including means for supplying a continuous web or strip of coherent blanks and means for subdividing the web into a series of discrete blanks, and means for conveying successive blanks of the series to an assembling station.

The web supplying means can include a bobbin or reel which is arranged to store a supply of convoluted web. Such apparatus can further comprise a magazine for temporary storage of at least one stack of superimposed discrete blanks between the reel and the conveying means. The magazine can be arranged to temporarily store a stack of blanks wherein the blanks of the stack have re-

gistering edges. The subdividing means can include a knife having a cutting edge which is aligned with the registering edges of blanks in the magazine.

The subdividing means can comprise a single knife 5 or a plurality of knives, e.g., a mobile knife and a stationary knife.

The apparatus can further comprise a support for the subdividing means. Such support can further mount at least a portion of the conveying means. Still further, the support can carry the aforementioned magazine 10 or at least one of a plurality of magazines for blanks. The magazine or magazines can be installed between the subdividing means and the assembling station. The magazine and/or the subdividing means can be pivotably mounted on the support. 15

A further feature of the present invention resides in the provision of a method of manipulating blanks in a machine for packing smokers' products each of which is to contain a blank of sheet-like material. The improved method comprises the steps of subdividing a continuous web of coherent blanks into a series of discrete blanks, and conveying discrete blanks of the series to an assembling station. 20

The method can further comprise the steps of establishing a source of supply of collars, transporting dis- 25

crete collars seriatim from the source of supply of collars to the assembling station, and locating successive supplied blanks in predetermined positions relative to successive discrete collars at the assembling 5 station. The locating step can include causing successive discrete collars to at least partially overlie the respective blanks at the assembling station.

The subdividing and conveying steps can replace steps of accumulating a stack of superimposed blanks and 10 conveying successive blanks of the stack to the assembling station.

The blanks can constitute coupons, revenue labels or the like.

The improved method can further comprise the step 15 of confining successive conveyed discrete blanks between inner and outer envelopes of discrete cigarette packs, e.g., between inner envelopes consisting of metallic foil and outer envelopes consisting of cardboard, paper or other suitable wrapping material. The outer envelopes 20 can include films of cellulose or other suitable light-transmitting material.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved apparatus itself, 25 however, both as to its construction and the modes of

assembling and operating the same, together with numerous additional important and advantageous features and attributes thereof, will be best understood upon perusal of the following detailed description of certain 5 presently preferred specific embodiments with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a fragmentary partly elevational and partly vertical sectional view of a portion of a cigarette packing machine identical with that disclosed in the aforesaid copending application, the means for transferring successive lowermost blanks from the lower end of a magazine to predetermined positions relative to successive collars at an assembling station being shown in a first position by solid lines and in a second position by broken lines;

Fig. 2 is a similar fragmentary partly elevational and partly vertical sectional view of an apparatus which embodies one form of the present invention; and

Fig. 3 is a similar view of an apparatus embodying another form of the present invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The apparatus which is shown in Fig. 1 forms part of or is combined with a cigarette packing machine and comprises a storage facility 10 here shown as a magazine which contains a supply (stack) 13 of superimposed blanks 11 each of which can constitute a coupon carrying an advertisement, promotional material or the like. The purpose of the apparatus is to transfer successive blanks 11 from the outlet at the lower end of the magazine 10 into the range of a collar 19 which is to form part of a finished hinged lid pack containing an array of smokers' products. It is customary to bring successive blanks 11 into contact with the inner envelopes of packs 15 each of which contains an array of smokers' products (e.g., an array of plain or filter cigarettes, cigars, cigarillos or cheroots in a so-called quincunx formation). The inner envelope can consist of metallic foil which directly surrounds and confines an array. The manner in which a blank can be positioned in a finished hinged lid cigarette pack having inner and outer envelopes is shown, for example, in Figure 1 of US patent No. 20 5,657,609 granted August 19, 1997 to Spada et al. for "METHOD OF FORMING HARD POCKETS, IN PARTICULAR FOR CIGARETTES OR THE LIKE, CIGARETTES PACKING MACHINE AND COLLAR FOR IMPLEMENTING THE SAID METHOD".

A properly transferred blank 11 comes to rest beneath the collar 19 at a pocket 18 of a folding device 17 (e.g., a turntable or an analogous packing conveyor). The means for conveying successive blanks 11 from the magazine 10 to the collar 19 at an assembling station AS comprises suction heads or suction cups 12 at least one first of which is mounted on a pivotable or turnable carrier or arm 14 and at least one second of which is provided on an indexible suction wheel 16. In the positions which are shown in Fig. 1, the two suction heads 12 attract the lowermost blank 11 in the magazine 10 from below preparatory to conveying in the direction of arrow 23, namely away from the magazine and to a position (at the station AS) in which the freshly withdrawn blank is at least partially overlapped by the collar 19 and overlies the pocket 18 of the folding device (packing conveyor) 17. The character 37 denotes that marginal portion or edge of the lowermost blank 11 in the magazine 10 which is engaged by the suction head 12 of the suction wheel 16; such edge 37 registers with the edges of the blanks 11 which are located above the lowermost blank.

The carrier 14 is pivotable about the axis of a horizontal shaft 15. This carrier must overcome a certain resistance which is offered by the lowermost blank 11 to its extraction from the magazine 10; to this end,

the outlet of the magazine is preferably provided with suitable retaining means, e.g., in the form of metallic or plastic or elastic strips (not shown in Fig. 1) which underlie two or more marginal portions of the lowermost 5 blank 11 in the magazine but permit extraction of such blank by the two suction heads 12 which are illustrated in Fig. 1. The suction wheel 16 is turnable by the pivotable carrier 14 in and counter to the direction indicated by the arrow 22 and its suction head 12 is 10 spaced apart from the suction head 12 on the carrier 14.

Once the lowermost blank 11 is withdrawn from the magazine 10, the right-hand suction head(s) is or are sealed from a suitable suction generating device (e.g., the suction intake of a blower, not shown) so that the 15 next stage of conveying of such blank is carried out solely by the suction head(s) 12 borne by the suction wheel 16. At such time, the suction wheel 16 turns in a counterclockwise direction (as indicated by the arrow 22) and advances the blank 11 along an arcuate path toward and at least partially beneath the collar 19 at the 20 assembling station AS. On its way with the suction head(s) 12 of the suction wheel 16, the blank 11 is caused to advance along a stationary arcuate guide 26 and into the range of an entraining member 20. The latter 25 engages the delivered blank 11 as soon as the suction

head(s) 12 of the suction wheel 16 releases or release
the blank. Separation of the blank 11 from the suction
head(s) of the wheel 16 is effected by a separating
device 24 which strips the blank off the suction wheel
5 and its suction head(s).

The entraining member 20 pushes the freshly
released blank 11 further in the direction of the arrow
22 until the blank reaches the desired or required or
prescribed position with reference to the collar 19. The
10 entraining member 20 shares the angular movements of the
suction wheel 16 and includes a projection which engages
and entrains the adjacent edge face of the blank 11 that
is on its way toward the position in which it overlies
the pocket 18 of the folding device 17 beneath the collar
15 19.

The means for transporting successive collars 19
from a source (see the copending application) to the
assembling station AS comprises a suitable conveyor which
can deliver successive collars 19 directly to the station
20 AS or onto the folding device (packing conveyor) 17 at
a location ahead of such station; the device 17 is thereupon
indexed once or more than once in order to advance
the collar 19 and to support the collar at the station
AS. The collar at this station is or can be at a stand-
25 still when an oncoming blank 11 reaches its prescribed

position relative to the pocket 18 which is shown in Fig.

1.

The means for positively guiding successive blanks 11 in their path from the outlet of the magazine 10 to the assembling station AS further comprises a second guide 21 which directs each of the blanks to a requisite position relative to the collar 19 then occupying such position. This position is determined by the end portion 25 of the guide 21. The guides 26 and 21 can positively 10 guide each blank 11 during each or practically each stage or during a major (substantial) stage of conveying the blank from the magazine 10 to the station AS. The folding device 17 holds the collar 19 at the station AS (either alone or in conjunction with one or more 15 additional parts) in a predetermined position at least during the last stage of conveying a blank 11 to this station.

A blank 11 which assumes the requisite position at the assembling station AS is thereupon caused to move 20 stepwise in the packing machine including the folding device 17 to a position in which it is located between the collar 19 and a partly finished cigarette pack P (one shown in Fig. 1); such pack can include an array of plain or filter cigarettes or other smokers' products 25 and an inner envelope consisting of metallic foil or an-

other suitable wrapping material. The manner in which the treatment of a blank 11 arriving at the assembling station AS progresses is described in adequate detail in the copending application and forms no part of the present invention.

The apparatus which is shown in Fig. 2 embodies one form of the present invention and differs from the apparatus of Fig. 1 in that it need not employ a magazine 10 or an analogous storage facility for blanks 11. Instead, the apparatus of Fig. 2 employs a device which is designed to subdivide an elongated continuously or intermittently running web or strip 29 of coherent blanks 11 into a series of discrete blanks which are accepted by the suction heads 12 of the carrier 14 on the shaft 15 and of the suction wheel 16 for conveying toward the assembling station AS.

The web 29 is drawn off a source 34 (such as a reel or spool) by two rollers 28 (at least one of which is driven by a motor or the like) to advance in the direction of the arrow 28a, i.e., toward the suction heads 12.

In order to ensure a predictable conveying of successive blanks 11 into the range of the suction heads 12, the apparatus of Fig. 2 comprises an upper guide 32 and a lower guide 33. These guides flank the path of

the freshly obtained (separated) blank 11 to thus ensure that the suction heads 12 can properly engage such blank and entrain it toward the station AS. The leader of the web 29 can be threaded into the gap between the guides 5 32 and 33 prior to first actuation of a subdividing means including a stationary lower knife or counterknife 30 and a mobile (reciprocable) upper knife 31. The character 38 denotes the cutting edge of the lower knife 30. This cutting edge registers with the edge 37 of a blank 10. 11 which was separated or which is about to be separated from the leading end or leader of the remainder of the web 29.

It has been ascertained that the apparatus of Fig. 2 can produce and deliver a succession or a series of 15 blanks 11 in a highly reliable manner and at a frequency which is required in a modern cigarette packing or an analogous machine, e.g., in a cigarette packing machine known as COMPAS and distributed by the assignee of the present application.

20 The upper guide 32 overlies the suction head 12 of the carrier 14 to ensure the establishment of a requisite pressure when the right-hand suction head 12 of Fig. 2 is connected to a suction generating device.

25 The apparatus of Fig. 2 can be modified in a number of ways without departing from the spirit of the present

invention. For example, the stationary cutter 30 can be replaced with a mobile cutter to be utilized with a stationary severing tool replacing the cutter 31 or with the cutter 31.

5 Fig. 3 shows an apparatus which constitutes a further modification of the apparatus of Fig. 2. Thus, a blank 11 (such as a coupon) which has been severed from the leader of the web 29 can be accepted by the suction heads 12 in the same way as already described with reference to Fig. 2, or it can be delivered for temporary storage into a container 36. To this end, the apparatus of Fig. 3 comprises a further suction wheel 35 which can accept and entrain successive or selected foremost blanks 11 from the guides 32, 33.

15 The apparatus of Fig. 3 can be utilized with advantage to accept a certain number of blanks 11 when the packing machine including the folding device 17 is idle or operates at less than normal speed, as well as to supply blanks 11 to the suction heads 12 when the trailing end of the web 29 being supplied by an expiring reel 34 is being spliced to the leader of the web on a fresh reel. The suction wheel 35 is or can be reversible so that it can feed blanks 11 into the container 36 or from this container and into the range of the suction heads 12. Thus, the container 36 can cooperate with the

suction wheel 35 to supply to the assembling station AS stored blanks preparatory to and during replacement of an expired reel 34 with a fresh reel.

It is also possible to employ the container 36 as a storage facility for blanks 11 which are to be supplied to the assembling station AS (when necessary) and which need not be obtained as a result of repeated severing of the web 29.

The characters 39 denote two photoelectric or other suitable sensors of a device which monitors the running web 29 and generates signals which are utilized to denote the quality of the coupons 11, e.g., the quality and/or the presence or absence of printed matter and/or other information borne by the blanks forming part of the web 29. For example, the control system which processes signals furnished by the sensors 39 can be utilized to start the suction wheel 35 so that the latter can deliver defective blanks into the container 36 or to another destination.

The improved method and apparatus exhibit the important advantage that the subdividing means 30, 31 or their equivalents render it possible to provide successive blanks 11 with clean edges and to form such blanks close to the assembling station AS so that the likelihood of subjecting the blanks to undesirable deforming

stresses (such as creasing, folding crimping or the like) is much less pronounced than if the blanks are manipulated in accordance with prior proposals. In addition, the absence of large or huge magazines for storage 5 of any or all blanks before they reach the assembling station contributes to compactness of the packing machine which embodies the improved apparatus. Still further, the subdividing means including the means 131 (Fig. 2) for moving the knife 31 is or can be adjustable so that 10 the dimensions of the blanks 11 can be selected with a high degree of accuracy as well as that the subdividing means can be set up to furnish blanks of two or more different sizes. Last but not least, the subdividing means can be readily constructed, assembled and installed to 15 supply blanks at a rate which is required in a modern high-speed packing machine for cigarettes or other smokers' products.

The blanks 11 can constitute coupons, i.e., two-dimensional sheets or panels which can be provided with 20 advertising matter and/or other printed, embossed and/or otherwise applied information. The setup is or can be such that a blank which has been incorporated into a finished pack can be retrieved upon opening of the pack by the purchaser or that it is torn or otherwise prevented from 25 being reused upon opening of the finished pack.

The utilization of the illustrated web subdividing means (such as the knives 30, 31 and the means 131 for controlling the speed and/or other parameters of the mobile knife 31) contributes little (if anything) to complexity and cost of the packing machine embodying the apparatus of Fig. 2 or 3 but greatly enhances the versatility and reduces the space requirements of the machine.

The exact nature of the means for splicing the expiring web 29 on the reel 34 of Fig. 2 to the leader of the web 129a on a fresh reel 134 shown in Fig. 2 forms no part of the present invention. Such splicing devices are known in the field of making smokers' products, for example, in machines for the making of filter cigarettes to connect the trailing end of an expiring web of so-called tipping paper to the leader of a fresh web of tipping paper. Reference may be had, for example, to US patent No. 4,469,111 granted September 4, 1984 to Pinck et al. for "APPARATUS FOR PERFORATING WEBS OF WRAPPING MATERIAL FOR TOBACCO OR THE LIKE" and to US patent No. 3,730,811 granted May 1, 1973 to Wendt and referred to in the patent to Pinck et al. Those portions of an expiring web and of a fresh web which are spliced together are or can be removed from the packing machine in order to prevent one or more defective blanks from

reaching the assembling station. A conveyor can be provided to admit defective blanks into a collecting receptacle or the like.

The subdividing means (such as that including the knives 30, 31) is preferably assembled and installed in such a way that the cutting edge 38 at the severing station assumes a position in which it is flush (i.e., in which it registers) with one edge of each of a stack of blanks in a magazine, such as the magazine 10 of Fig. 1 if the subdividing means is set up to supply a succession of freshly severed blanks 11 into the magazine. Such mounting of the subdividing means facilitates and simplifies a replacement or an exchange of stacks or other types of supplies of accumulated blanks without any or without extensive alterations of the means for conveying blanks from the storage facility to the assembling station and/or to any other station(s) of a cigarette packing machine. As used herein, the term "flush" or "register" is intended to denote that the edges of neighboring blanks in a stack or the severed edges of successively obtained discrete blanks overlie or overlap each other. As already mentioned hereinbefore, such edge of the lowermost blank 11 in the magazine 10 of Fig. 1 is denoted by the character 37. The corresponding edge of the topmost blank in the magazine 10 of Fig. 1 can

be aligned with the cutting edge 38 shown in Fig. 2.

The utilization of a severing or subdividing means employing only two knives, especially a single mobile knife and a single stationary knife, contributes to 5 simplicity and lower cost of the improved apparatus.

The apparatus of Figs. 2 and 3 can be further provided with a suitable support for the subdividing means, for a portion of or for the entire means which conveys blanks 11 from the severing station to the 10 assembling station AS, for a magazine if such is employed in the improved apparatus and/or for the means (including the wheels 28 shown in Figs. 2 and 3) which supplies the web 29 to the severing station accommodating the stationary knife 30. An advantage of such support (a portion 15 of which is shown in Fig. 2, as at 40) is that the part or parts borne by the support can be installed in or removed from the packing machine in a simple and time-saving operation. In addition, once the support 40 is installed or reinstalled in the packing machine, all of 20 the parts or groups of parts borne by such support are automatically located in optimum positions relative to each other and relative to other neighboring parts.

The support 40 (or a part which replaces or is used jointly with this support to carry one or more of the 25 components adapted to be mounted on the support) can

pivots or otherwise movably mount at least one part
of the improved apparatus, e.g., the web subdividing
means and/or a magazine 10 or 36 of another storage
facility for blanks. Pivots or any other adjustable
5 mounting of a magazine and/or of the web subdividing
means on the support 40 and/or on another suitable
carrier or support can be of advantage if the design of
the packing machine is such that, when in their normal
operative positions, the pivotable parts are not readily
10 accessible to the attendants but become readily or more
readily accessible upon pivoting to their inoperative
positions.

Still further, at least one support which is pivot-
ably mounted in a packing machine and carries two or even
15 more subdividing means and/or magazines can be installed
for movement between several positions in each of which
a different magazine is ready for use. Such mounting
greatly enhances the versatility of a packing machine
for cigarettes or the like.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features 5 that, from the standpoint of prior art, fairly constitute essential characteristics of the generic and specific aspects of the above outlined contribution to the art of methods of and apparatus for making and manipulating coupons for use in cigarette packing machines and the like 10 and, therefore, such adaptations should and are intended to be comprehended withing the meaning and range of equivalence of the appended claims.